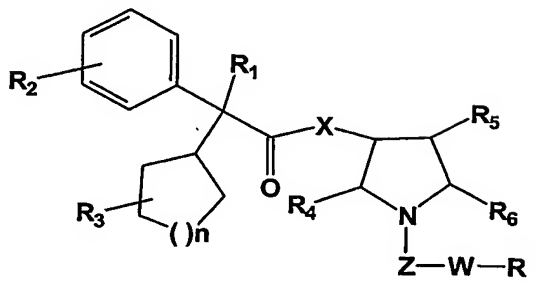
We Claim

1. A compound having the structure of Formula I:



Formula I

and its pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, diastereomers, N-oxides, polymorphs, prodrugs or metabolites,wherein

X represents an oxo, amino, lower alkyl(C_1-C_4)amino or lower alkoxy (C_1-C_4);

R_1 represents hydroxy, amino, or alkoxy (OR_7), wherein R_7 represents lower alkyl;

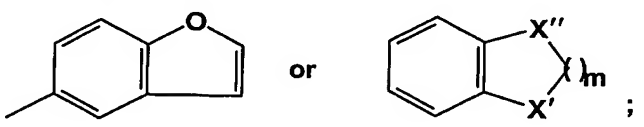
R_2 represents hydrogen, halogen (e.g. fluorine, chlorine, bromine and iodine) or lower alkyl;

R_3 represents hydrogen, keto, hydroxy, sulphonyl methane, tosyl, azide, amino or substituted amine (NHR_8) where R_8 represents hydrogen or YR_9, wherein R_9 represents benzyl, benzyloxy, alkyl, benzyl ether, phenyl optionally substituted with alkyl, trifluoromethyl, nitro or halogen (e.g. fluorine, chlorine ,bromine, iodine);

Z represents methylene, sulphonyl or carbonyl;

W represents a direct link of $(CH_2)_n$, where n is 1 or 2, lower alkoxy (C_1-C_4) or lower thioalkoxy (C_1-C_4);

R represents alkyl, aryl, aralkyl, benzyl ether, dimethyl ether, methoxy methyl, benzyl methyl ether or phenyl optionally substituted with alkyl, halogen (e.g. fluorine, chlorine, bromine, iodine) , nitro , heterocycle selected from the group consisting of pyridinyl, pyrazinyl or thienyl;



wherein X′ and X″ are each independently selected from the group consisting of oxygen, methylene; m represents 1 to 3; and

R_4, R_5 and R_6 represent hydrogen or lower alkyl.

2. A compound selected from the group consisting of:

2-cyclopentyl-2-hydroxy-N-[(3S)-1-benzyl-pyrrolidin-3-yl]-2-phenyl acetamide

2-cyclopentyl-2-hydroxy-N-[(3S)-1-[2-(1,3-benzodioxol-5-yl)ethyl]pyrrolidin-3-yl]-2-phenyl acetamide

(3S)-1-benzylpyrrolidin-3-yl cyclopentyl (hydroxy) phenyl acetate

(3S)-1-[[2-(1,3-benzodioxol-yl) ethyl]pyrrolidin-3-yl]cyclopentyl (hydroxy) phenyl acetate

(3S)-1-[[2-(2,3-dihydro-1-benzofuran-5-yl) ethyl]pyrrolidin-3-yl]cyclopentyl (hydroxy)phenyl acetate

(3S)-1-[(4-methyl-pent-3-enyl) pyrrolidin-3-yl] cyclopentyl (hydroxy) phenyl acetate

(3S)-1-[(4-trifluoromethylphenyl)sulfonyl]pyrrolidin-3-yl]cyclopentyl (hydroxy) phenyl acetate

(3S)-1-[(4-nitrophenyl)sulfonyl]pyrrolidin-3-yl]cyclopentyl (hydroxy) phenyl acetate

(3S)-1-benzyl-pyrrolidin-3-yl (2R)-hydroxy (3-oxocyclopentyl) phenyl acetate

(3S)-1-benzyl-pyrrolidin-3-yl (2R)-hydroxy (3-hydroxycyclopentyl) phenyl acetate

(3S)-1-[(phenyl acetyl) pyrrolidin-3-yl]cyclopentyl (hydroxy) phenyl acetate

(3S)-1-[(benzyloxy) acetyl)]pyrrolidin-3-yl]cyclopentyl (hydroxy) phenyl acetate

Benzyl (3S)-3-[(2-hydroxy-2-cyclopentyl-2-phenylpropanoyl) oxy]pyrrolidin-1-carboxylate

(3S)-1-[(4-bromophenyl) sulfonyl]pyrrolidin-3-yl]cyclopentyl (hydroxy) phenyl acetate

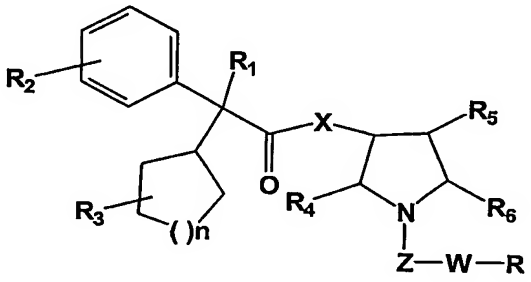
(3S)-1-benzyl-pyrrolidin-3-yl (2R)-cyclopentyl (hydroxy) phenyl acetate

(3S)-1-[[2-(2,3-dihydro-1-benzofuran-5-yl) ethyl]pyrrolidin-3-yl](2R)-cyclopentyl(hydroxy) phenyl acetate

(3S)-1-[[2-(1,3-benzodioxol-5-yl) ethyl]pyrrolidin-3-yl](2R)-cyclopentyl (hydroxy)phenyl acetate

3. A pharmaceutical composition comprising a therapeutically effective amount of a compound as defined in claim 1 or 2 optionally together with pharmaceutically acceptable carriers, excipients or diluents.

4. A method for treatment or prophylaxis of an animal or a human suffering from a disease or disorder of the respiratory, urinary and gastrointestinal systems, wherein the disease or disorder is mediated through muscarinic receptors, comprising administering to said animal or human, a therapeutically effective amount of a compound having the structure of Formula I,



Formula I

or its pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, diastereomers, N-oxides, polymorphs, prodrugs or metabolites, wherein

X represents an oxo, amino, lower alkyl(C_1-C_4)amino or lower alkoxy (C_1-C_4);

R_1 represents hydroxy, amino, or alkoxy (OR_7), wherein R_7 represents lower alkyl;

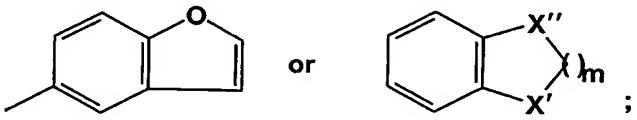
R_2 represents hydrogen, halogen (e.g. fluorine, chlorine, bromine and iodine) or lower alkyl;

R_3 represents hydrogen, keto, hydroxy, sulphonyl methane, tosyl, azide, amino or substituted amine (NHR_8) where R_8 represents hydrogen or YR_9, wherein R_9 represents benzyl, benzyloxy, alkyl, benzyl ether, phenyl optionally substituted with alkyl, trifluoromethyl, nitro or halogen (e.g. fluorine, chlorine ,bromine, iodine);

Z represents methylene, sulphonyl or carbonyl;

W represents a direct link of $(CH_2)_n$, where n is 1 or 2, lower alkoxy (C_1-C_4) or lower thioalkoxy (C_1-C_4);

R represents alkyl, aryl, aralkyl, benzyl ether, dimethyl ether, methoxy methyl, benzyl methyl ether or phenyl optionally substituted with alkyl, halogen (fluorine, chlorine, bromine, iodine), nitro, heterocycle selected from the group consisting of pyridinyl, pyrazinyl or thienyl;



;

wherein X′ and X″ are each independently selected from the group consisting of oxygen, methylene; and m represents 1 to 3; and

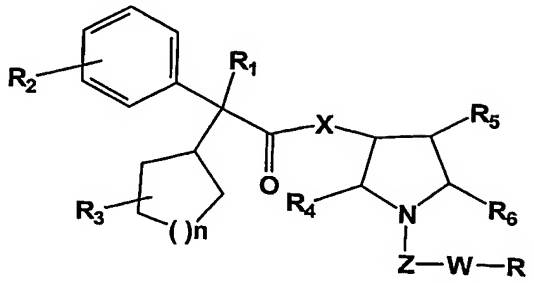
R_4, R_5 and R_6 represent hydrogen or lower alkyl.

5. The method according to claim 4 wherein the disease or disorder is urinary incontinence, lower urinary tract symptoms (LUTS), bronchial asthma, chronic obstructive pulmonary disorders (COPD), pulmonary fibrosis, irritable bowel syndrome, obesity, diabetes or gastrointestinal hyperkinesis.

6. The method for treatment or prophylaxis of an animal or a human suffering from a disease or disorder of the respiratory, urinary and gastrointestinal systems, where the disease or disorder is mediated through muscarinic receptors, comprrising administering to said animal or human, a therapeutically effective amount of the pharmaceutical composition according to the claim 3.

7. The method according to claim 6 wherein the disease or disorder is urinary incontinence, lower urinary tract symptoms (LUTS), bronchial asthma, chronic obstructive pulmonary disorders (COPD), pulmonary fibrosis, irritable bowel syndrome, obesity, diabetes and gastrointestinal hyperkinesis.

8. A process of preparing a compound of Formula I



Formula I

and its pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, diastereomers, N-oxides, polymorphs, prodrugs or metabolites, wherein

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R_1 represents hydroxy, amino, or alkoxy (OR_7), wherein R_7 represents lower alkyl;

R_2 represents hydrogen, halogen (e.g. fluorine, chlorine, bromine and iodine) or lower alkyl;

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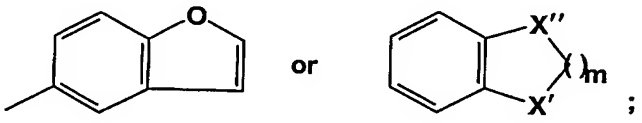
R represents alkyl, aryl, aralkyl, benzyl ether, dimethyl ether, methoxy methyl, benzyl methyl ether or phenyl optionally substituted with alkyl, halogen (e.g. fluorine, chlorine, bromine, iodine), nitro, heterocycle selected from the group consisting of pyridinyl, pyrazinyl or thienyl;

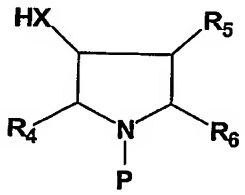


;

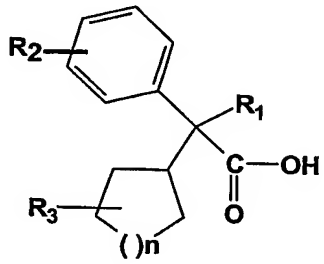
wherein X′ and X″ are each independently selected from the group consisting of oxygen, methylene; m represents 1 to 3; and

R_4, R_5 and R_6 represent hydrogen or lower alkyl, comprising

(a) coupling a compound of Formula II with a compound of Formula III

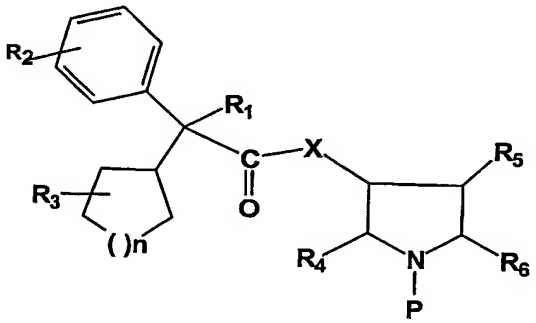


Formula II



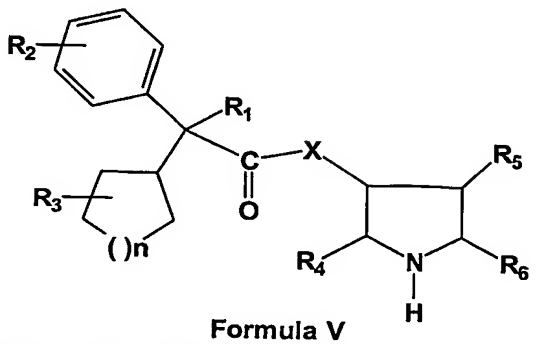
Formula III

wherein R_1, R_2, R_3, R_4, R_5, R_6, n and X are the same as defined earlier and P is a protecting group, to give a compound of Formula IV,



Formula IV

(b) deprotecting the compound of Formula IV in the presence of a deprotecting agent to give the compound of Formula V



Formula V

wherein R_1, R_2, R_3, R_4, R_5, R_6, X and n are the same as defined earlier, and

(c) N-alkylating/carbonylating or sulphonating the compound of Formula V with the compound of Formula L-Z-W-R wherein L is a leaving group and Z, W, R are the same as defined earlier, to give a compound of Formula I.

9. The process according to claim 8 wherein the reaction of a compound of Formula II with a compound of Formula III to give a compound of Formula IV is carried out in the presence of a coupling agent selected from the group consisting of N-methyl morphine, hydroxy benzotriazole, 1-(3-dimethyl amino propyl)-3-ethyl carbodiimide hydrochloride (EDC.HCL) and 1,8-diazabicyclo [5.4.0] undec-7-ene (DBU).

10. The process according to claim 8 wherein the reaction of a compound of Formula II with a compound of Formula III to give a compound of Formula IV is carried out in a suitable solvent selected from the group consisting of N, N dimethylformamide, chloroform, dimethylsulphoxide, xylene and toluene.

11. The process according to claim 8 wherein the protecting group P is selected from the group consisting of benzyl and t-butyloxy carbonyl.

12. The process according to claim 8 wherein the deprotection of a compound of Formula IV is carried out with a deprotecting agent which is selected from the group consisting of palladium on carbon, ammonium formate, trifluoroacetic acid and hydrochloric acid.

13. The process according to claim 8 wherein the deprotection of a compound of Formula IV is carried out in a suitable organic solvent selected from the group consisting of methanol, ethanol, tetrahydrofuran and acetonitrile.

14. The process according to claim 8 wherein the deprotection of a compound of Formula IV is carried out a temperature ranging from about 10-50°C.

15. The process according to claim 8 wherein the N-alkylation, carbonylation or sulphonylation of a compound of Formula V to give a compound of Formula I is carried out with a suitable alkylating, carbonylating, or sulphonylating agent of Formula L-Z-W-R wherein L is any leaving group and Z, W and R are the same as defined earlier.

16. The process according to claim 15 wherein the N-alkylation, carbonylation or sulphonylation of a compound of Formula V is carried out in a suitable solvent selected from the group consisting of N,N-dimethylformamide, dimethylsulfoxide, tetrahydrofuran, acetonitrile and dichloromethane.

17. The process according to claim 15 wherein the leaving group L is selected from the group consisting of halogen, O-tosyl, O-mestyl and benzyl.